Velicsek | ARTISTIC ANATOMY

HUMAN ANATOMY FOR ARTISTS

Comprehensive Handbook of Visual Reference of the Human Skull

Insights into Measurements, Proportions, Landmarks, Planes, and Bone Parts

Human Anatomy for Artists: Comprehensive Handbook of Visual Reference of the Human Skull

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Introduction

After spending the last decade in the field of human anatomy, I continue to find the human skull and face to be incredibly fascinating and challenging. A particularly exciting phase of my career involved working on an advanced human skull model, coupled with hands-on experience using real specimens under the guidance of a seasoned medical expert. Along this path, I've distilled a set of fundamental rules that, in my view, form a helpful guide for artists. Emphasising simplicity, my aim has been to spotlight the different aspects of the human skull. This guide, born from a desire to share insights gained over the years, is intended to serve as a companion for artists seeking to enhance the accuracy of their work. By understanding the primary shapes and planes of the skull, this book hopes to provide a solid foundation for portrait creation, grounded in a comprehensive understanding of human anatomy. I trust you'll find as much enjoyment in using this guide as I did in its creation.

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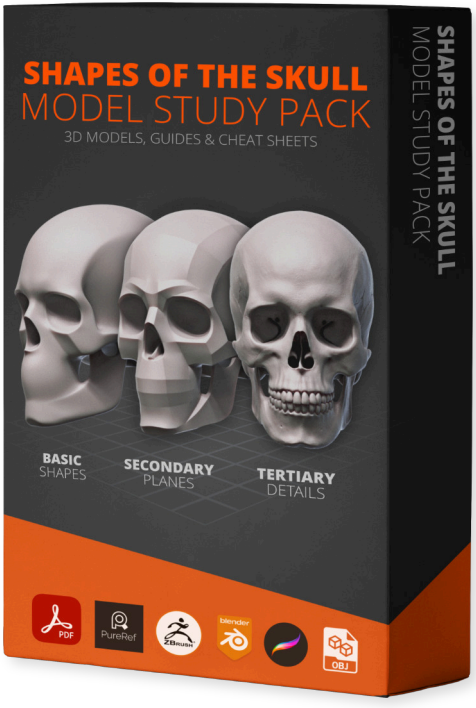
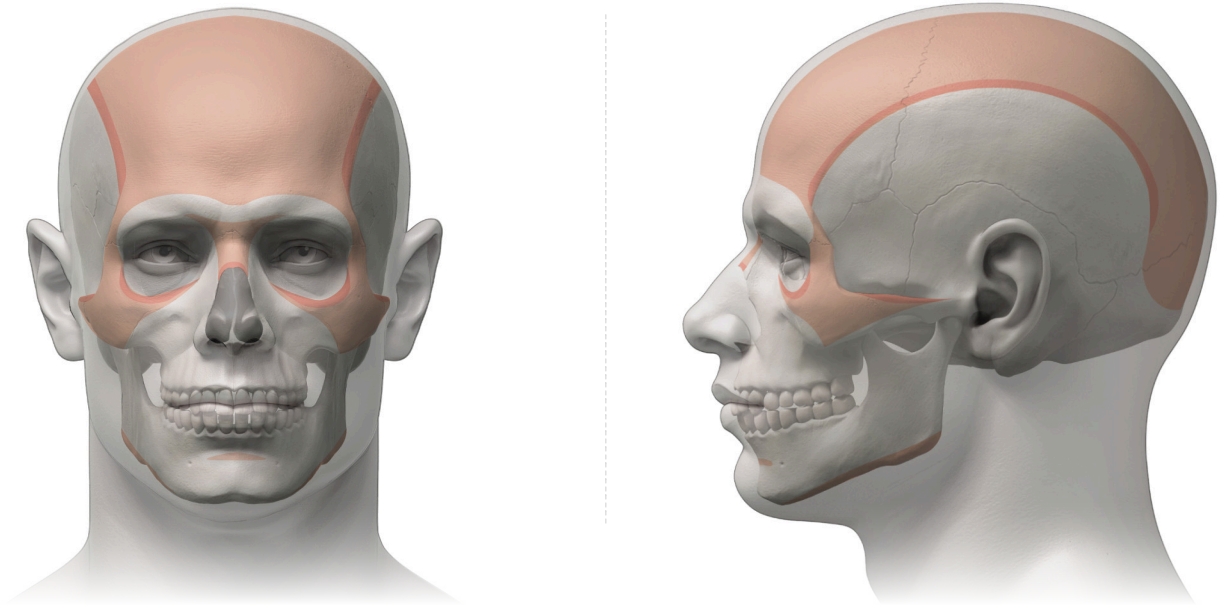




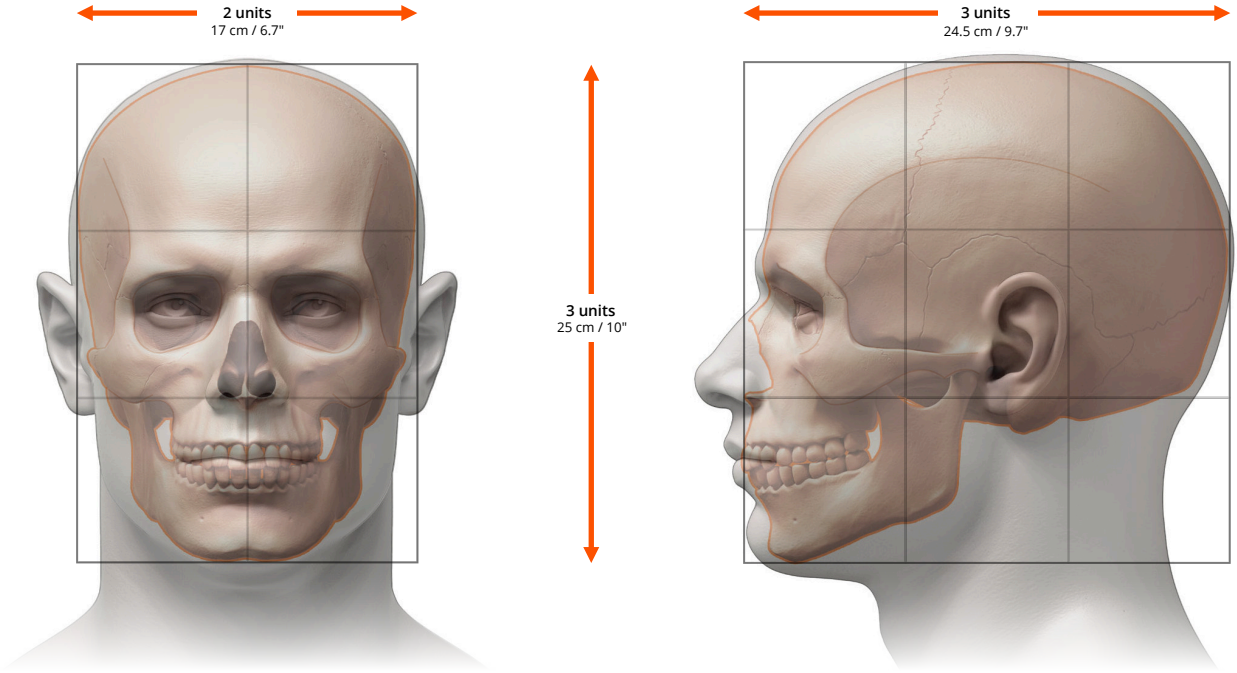
Bony Landmark & Plane Change Shape Driven by Bone Structure

Ever wondered what lies beneath surface of the human face?

By studying the shape and anatomy of the skull you will start to see the hidden foundations of the head. Let's take a closer look at the landmarks.

These landmarks serve as constant points of reference on the human face. While facial muscles constantly change with expressions, these landmarks remain fixed, serving as stable reference points on the human face. They provide a solid foundation for studying and defining the unique shapes of the face.

The lighter red areas show the large surface areas of the human head that are shaped and driven by the underlying bones. Meanwhile the dark red lines indicate the visible plane changes, which contribute to its character and define its angles.

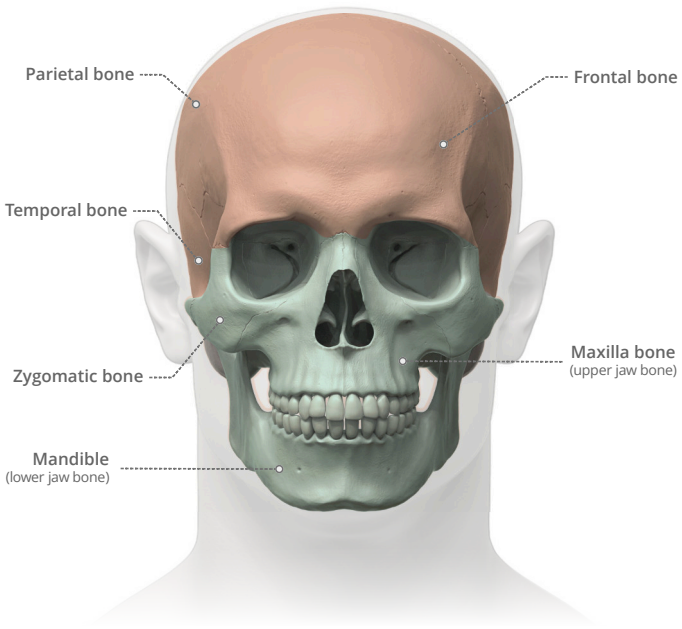


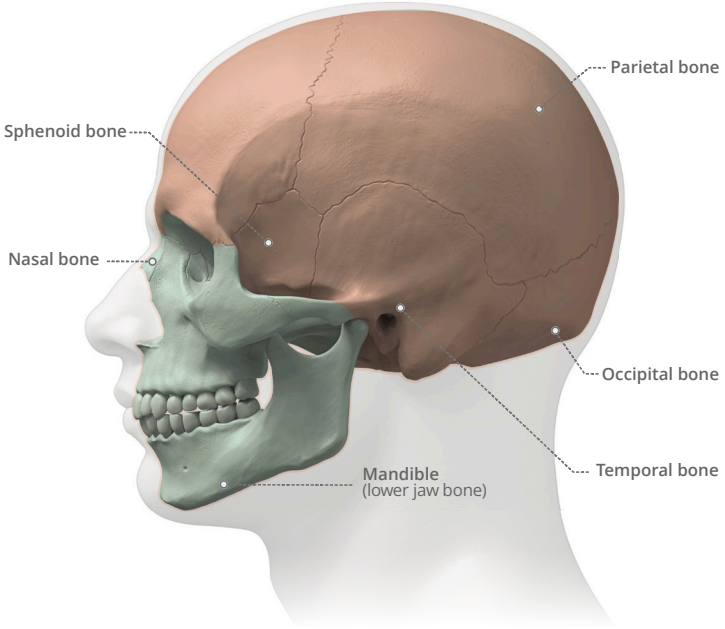
Each individual skull possesses unique and distinctive anatomical features that can depend on many factors.

To have a solid foundation to build upon we need to use the average skull measurements & propositions.

These are the primary building blocks to drawing the head. At the most basic level, we can deconstruct the skull by dividing it into equal-sized squares.
In general, we want to use 2x3 measurements for the front view and 3x3 for the side view. Showing that the front of the face is narrow and the side is a square.

The skull height measures approximately 25 cm or 10 inches, the skull width is around 17 cm or 6.7 inches, the skull length spans about 24.5 cm or 9.7 inches.
By familiarising ourselves with these average measurements, we establish a foundation for studying and understanding the varying dimensions of the skull.



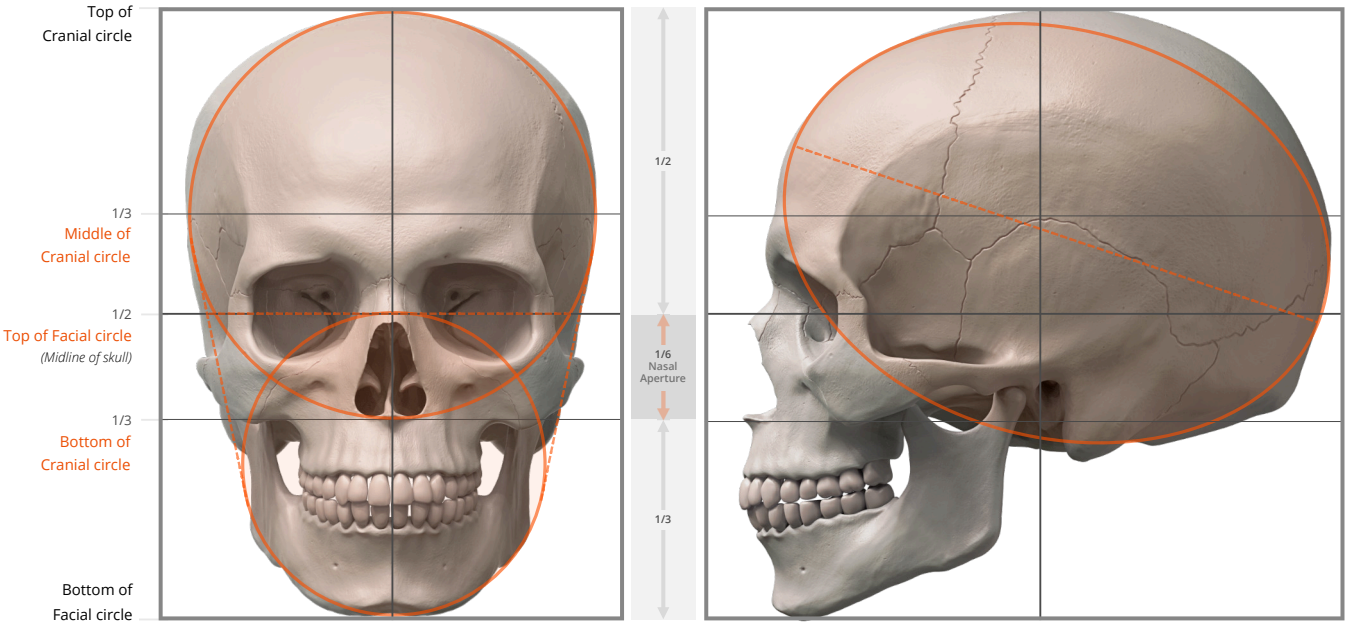


The Facial and Cranial regions are two main areas of the skull. Each has very different & important functions.

They have distinct roles - The Cranial Bones houses & protects the brain and the Facial Bones form our face.

Facial Bones: The facial bones play a crucial role in supporting the facial features and providing attachment points for muscles involved in facial expressions. These bones include the nasal bones, maxillae, mandible, zygomatic bones, lacrimal bones, palatine bones, vomer bone, and inferior nasal conchae.

Cranial Bones: The portion of the skull that encloses and protects the brain. It consists of eight bones, these include the singular frontal, occipital, sphenoid, and ethmoid bones as well as the double parietal and temporal bones.

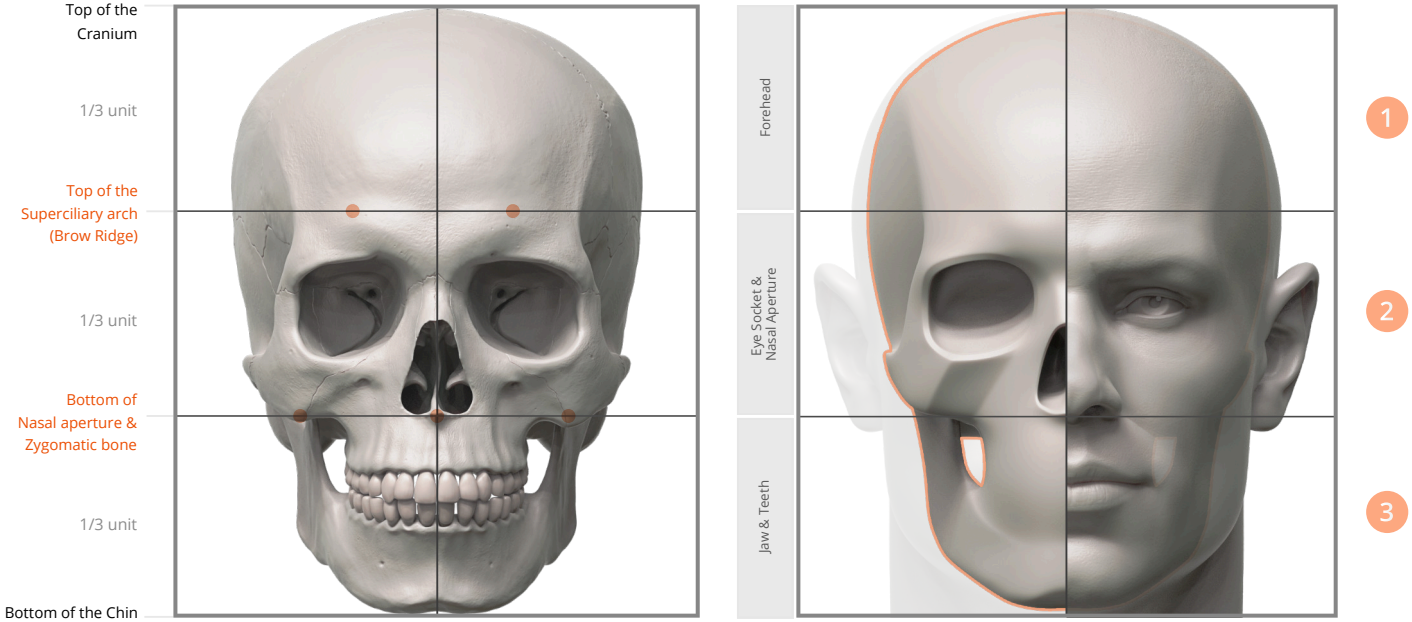


Using simple circles to define the main parts of the head helps us describe the skull's shape quickly & accurately.

The Bammes method makes this process easy with just two simple steps.

The smaller circle defines most of the facial section, starting from the bottom of the chin and ending in the middle of the face, where the eye line and the top of the nasal aperture are located. The intersection of these circles helps define the nasal aperture, this is found between ½ (top of facial circle) and ⅓ (bottom of cranial circle).

The profile view of the skull resembles an egg shape, with it directed towards the forehead and the back of the skull where it transitions into the neck. Approximately two-thirds of the face is occupied by this shape.

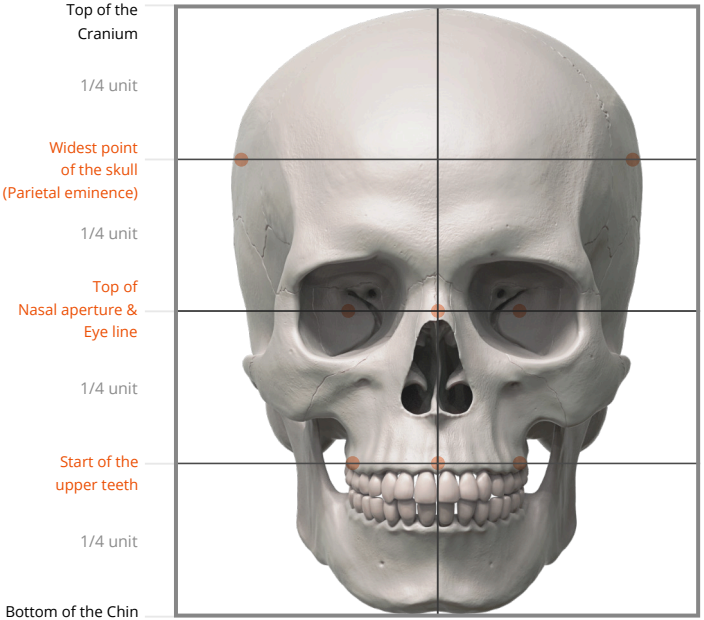


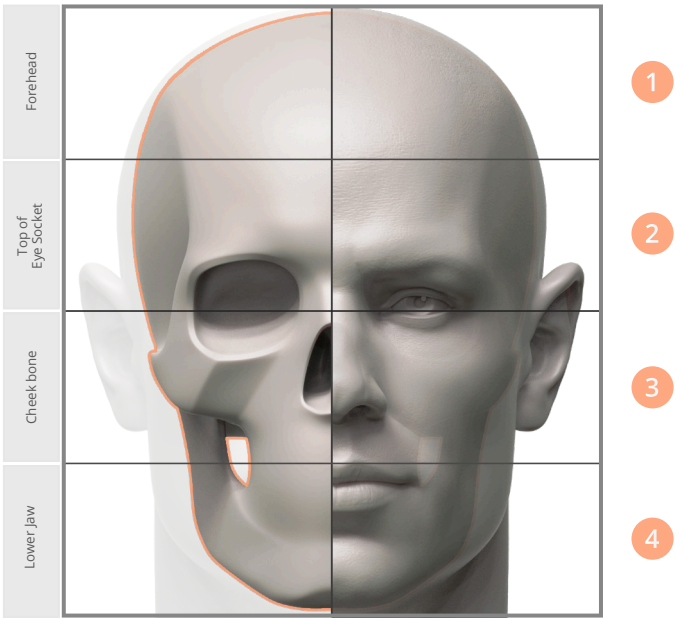
Dividing the Skull into well defined regions helps us to establish the main landmarks with reliable accuracy.

First we will use the rule of thirds blocking out key regions so we can balance the proportions confidently.

The first is the top of the **Superciliary Arch**, also known as the Brow Ridge. As we move downward, we encounter the Bottom of the **Nasal Aperture** and the lower extent of the **Zygomatic Bone**. These divisions create three distinct regions: the Forehead at the top, the Eye Socket and Nasal Aperture in the middle, and the Jaw and Teeth at the bottom.

The Rule of Thirds serves as a guiding principle for your artwork, simplifying the complexity of the human skull and facilitating easier navigation.





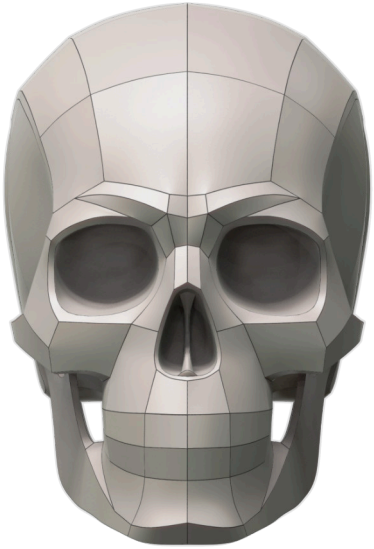
Splitting the skull into four additional parts will define secondary landmarks that will further advance our accuracy.

Using four horizontal divisions will reveal three additional landmarks and four key regions that will help us navigate each portion of the skull with ease.

Firstly, it aids in identifying the Widest Point of the skull, known as the **Parietal Eminence**. Secondly, it allows us to locate the **Top of the Nasal Aperture** and **Eye Line**, which coincides with the exact midpoint of the head. Third, it helps us pinpoint the **start of the upper teeth**. These divisions establish four distinct regions: the Forehead at the top, followed by the Top of the Eye Socket and Cheekbone below the midline and the Lower Jaw at the bottom. Embracing these divisions facilitates a deeper understanding of skull proportions and aids in the accurate representation of distinct facial regions.

1 Primary Shapes

2 Planes of the Skull



3 Tertiary Shapes & Details

Mastering the human skull means grasping three key dimensions and how they build on each other.

Constructing the skull methodically makes the process easier and more manageable.

Primary Shapes simplify the skull into basic 3D forms for practical use, helping us focus on essential masses. Meanwhile, the Planes of the skull highlight changes in planes and shape intricacies, enhancing our understanding of how light interacts with the shapes.

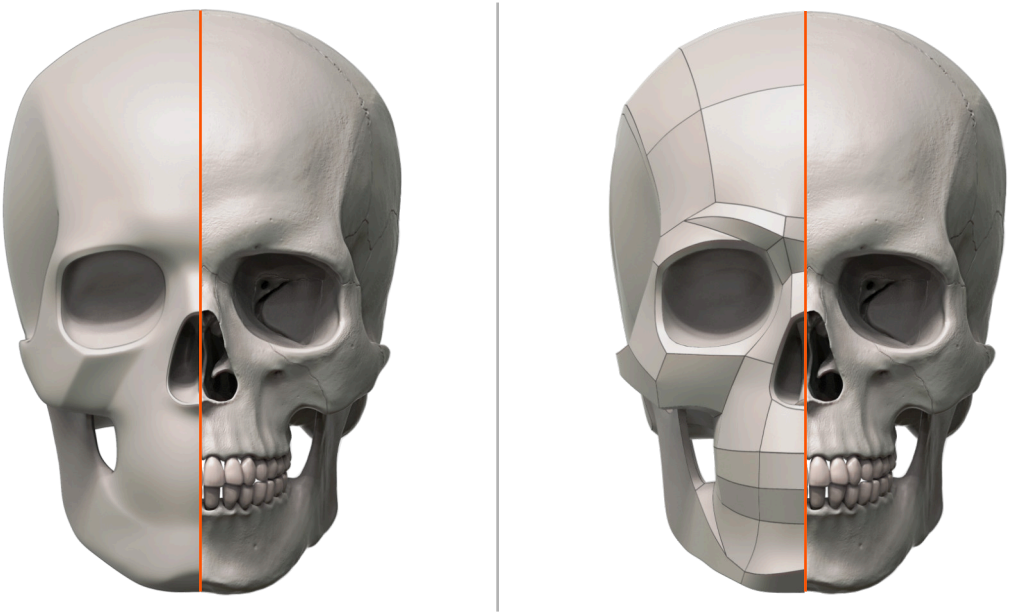
The Tertiary Shapes & Details act as our main references, like the destination on a map, complementing the Primary Shapes and Planes. Each detail plays a crucial role, with some hidden but observable on the face.

Studying and analysing the skull from multiple angles is the key to build a comprehensive understanding of the shapes and their functions.

Creating your own reference in 2D or 3D will give your work a big boost and helps you understand the principles better.

Understanding the Primary Shapes, Planes of the Skull , as well as the Tertiary Shapes and Details, is crucial for artists aiming to create realistic and accurate representations. The primary shapes and planes refer to the fundamental geometric forms and flat surfaces that make up the overall structure of the skull, such as the rounded cranium and the flat planes of the face.

By mastering these primary shapes and planes, artists can establish a solid foundation for depicting the three-dimensional structure of the skull. Tertiary shapes and details encompass the finer nuances, intricacies, and variations that make each skull unique, including the subtle curves, contours, and surface details like the sutures and foramina. Understanding these tertiary shapes and details enables artists to capture the individuality and realism of the human skull, adding depth and a unique authenticity to their artistic renderings.



Compare and contrast skulls side by side to truly see what those basic shapes and planes are emphasising.

Ask yourself what these simple shapes and planes represent, and look beyond the complexity.

Comparing the designs helps you focus on what truly matters beneath the complex details. It simplifies understanding the big foundational shapes, the ones that shape the core of the skull. Additionally, it makes analysing the main lines and outline of the skull easier.

When we go one level deeper, you can spot subtle changes that are harder to detect. Let the lines be your guide and you won't be able to unsee the shape changes afterward. This process helps break down intricate shapes and details and makes them simpler to understand.

Frontal Planes
- Frontal Bone
- Brow ridge
- Nasion
- Front-to-top plane transition

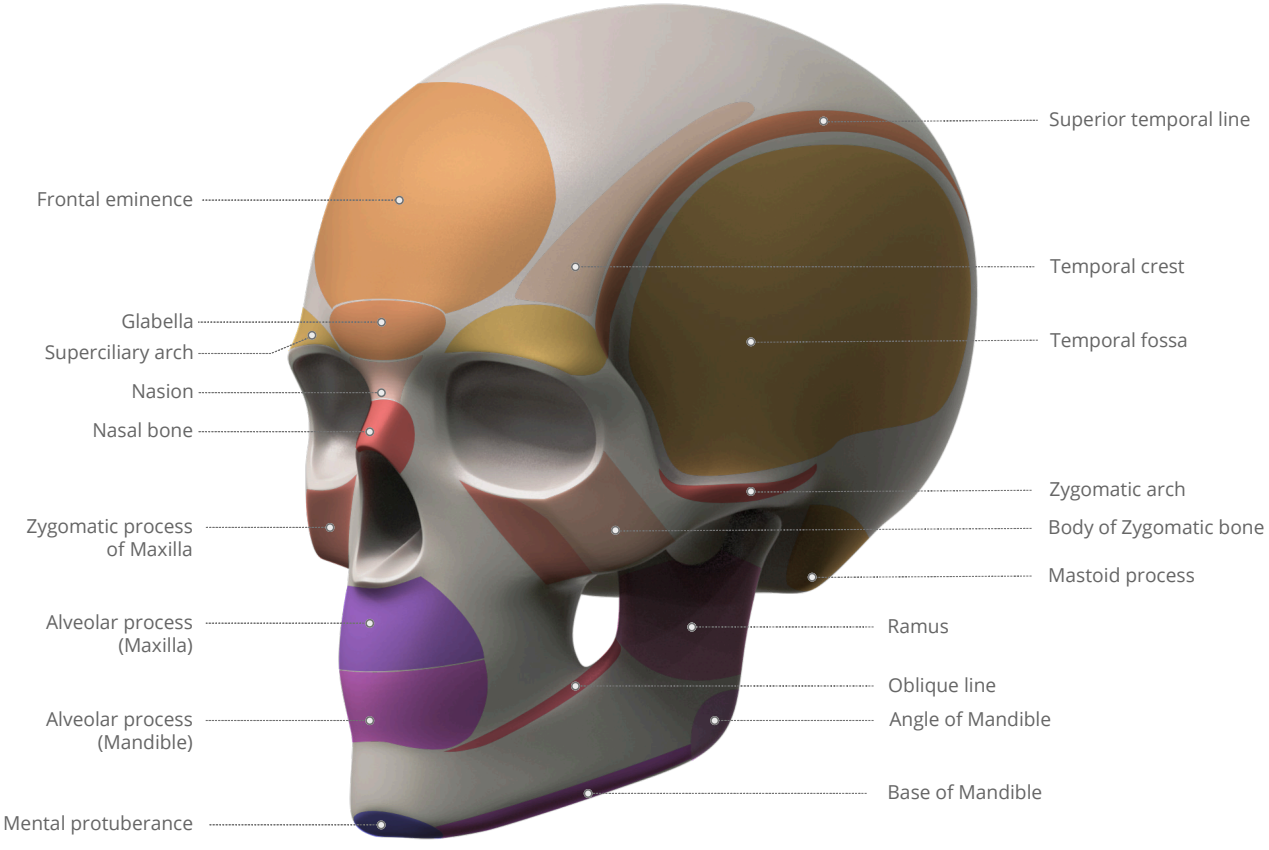
Parietal Plane
- Parietal eminence
- Temporal line

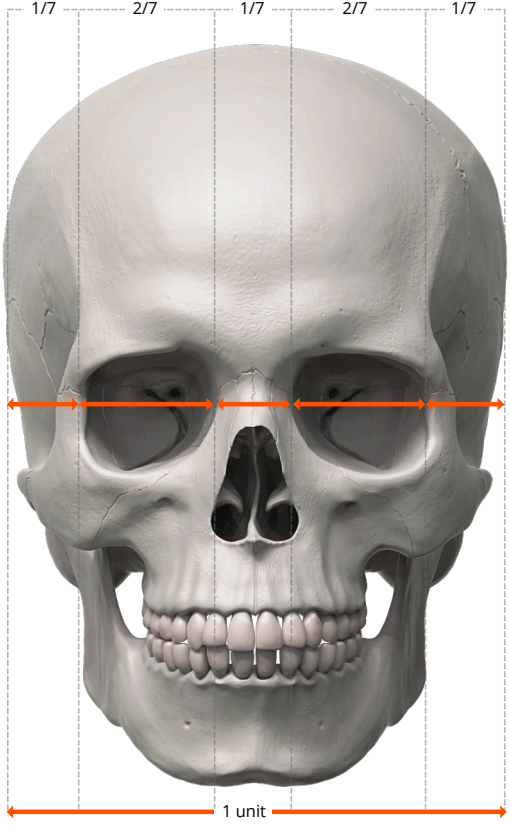
Eye & Nasal Planes
- Eye sockets
- Zygomatic arch
- Cheek bones
- Nasal bone
- Nasal aperture

Temporal Plane
- Temporal line
- Mastoid process

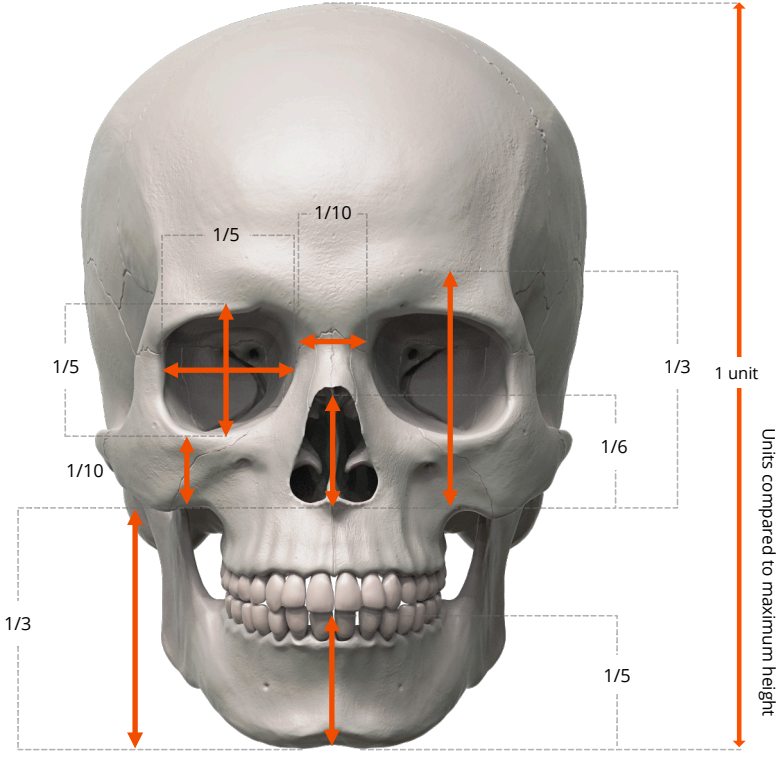
Jaw & Teeth Planes
- Upper teeth
- Lower teeth
- Body of Mandible
- Mental Protuberance

Mandibular Plane
- Coronoid process
- Ramus
- Angle of Mandible
- Mandibular notch


Superior temporal line
Frontal eminence
Temporal crest
Glabella
Temporal fossa
Superciliary arch
Nasion
Nasal bone
Zygomatic arch
Zygomatic process of Maxilla
Body of Zygomatic bone
Mastoid process
Alveolar process (Maxilla)
Ramus
Oblique line
Alveolar process (Mandible)
Angle of Mandible
Base of Mandible
Mental protuberance

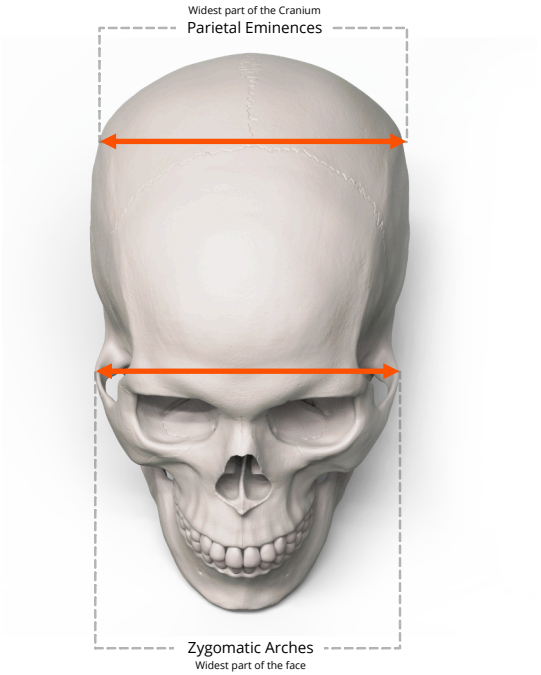


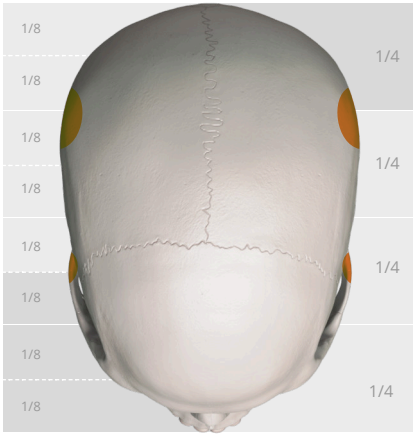
Units compared to maximum width
(1 unit = maximum cranial breadth)



In this section, you will find a summarised reference highlighting frequently used divisions of the human skull.

Study the illustration above carefully and use it as a base guide. In the following pages, I will provide an extended analysis of these divisions, placing particular emphasis on the third and quarter lines and divisions, which serve as foundational guides to assist you in your studies.





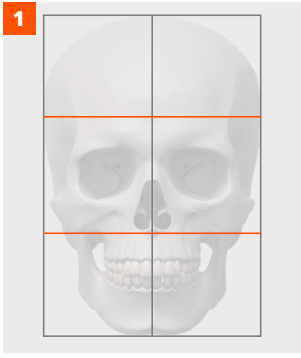
Top View

Front View

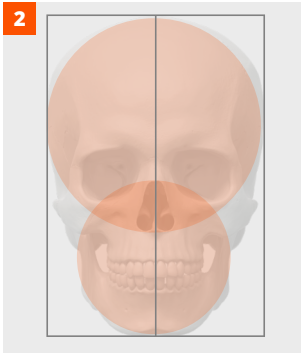
Recognizing the widest points of the skull is instrumental in understanding the boundaries of the human head.

The widest part of the skull resides within the cranium and is characterised by the prominent bony landmarks known as the **Parietal Eminences**. These landmarks are easily identifiable due to their distinctive convex shape. When observing the skull from both a top-down and front view, these widest points can be pinpointed at approximately ¼ unit measurements.

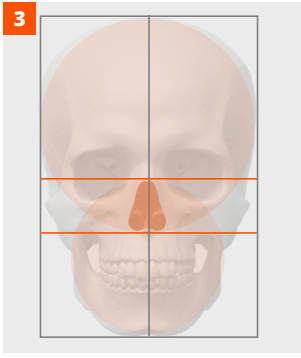
This is located at the top and back quarter of the skull. Moving to the facial portion, the widest part can be found at the **zygomatic arches**. When viewed from above, it is situated at around of the overall depth of the head, while in the front view, it can be located at approximately ⅖ of the width.



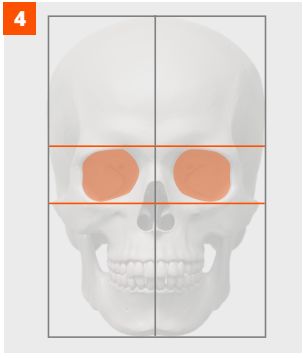
Step 1: Begin by establishing the fundamental proportions and dimensions of the skull using the rule of thirds through 6 equal-sized squares. (See Page 2)



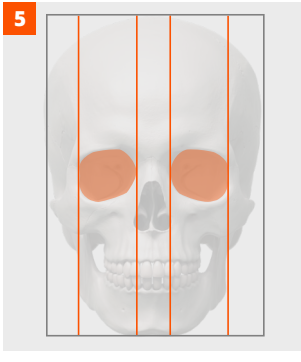
Step 2: Next, use two circles to define the cranial and facial masses, which will help establish the two main regions of the skull. (See Page 4)



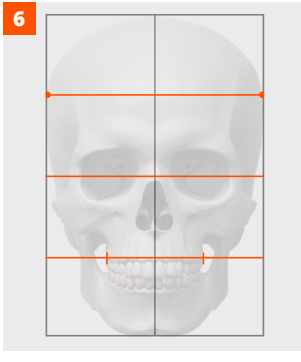
Step 3: Utilise the same circles to pinpoint the position of the nasal aperture by observing their intersection, establishing an important landmark. (See Page 4)



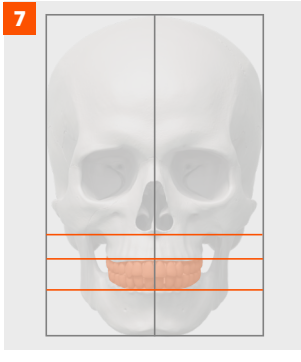
Step 4: Continuing, we will define the orbital bones and the eye cavity, which contribute to one of the most significant landmarks. (See Page 12)



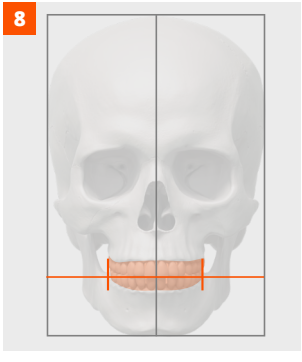
Step 5: Once the horizontal location of the eye cavities is determined, proceed to define their precise width and the distance between them. (See Page 12)



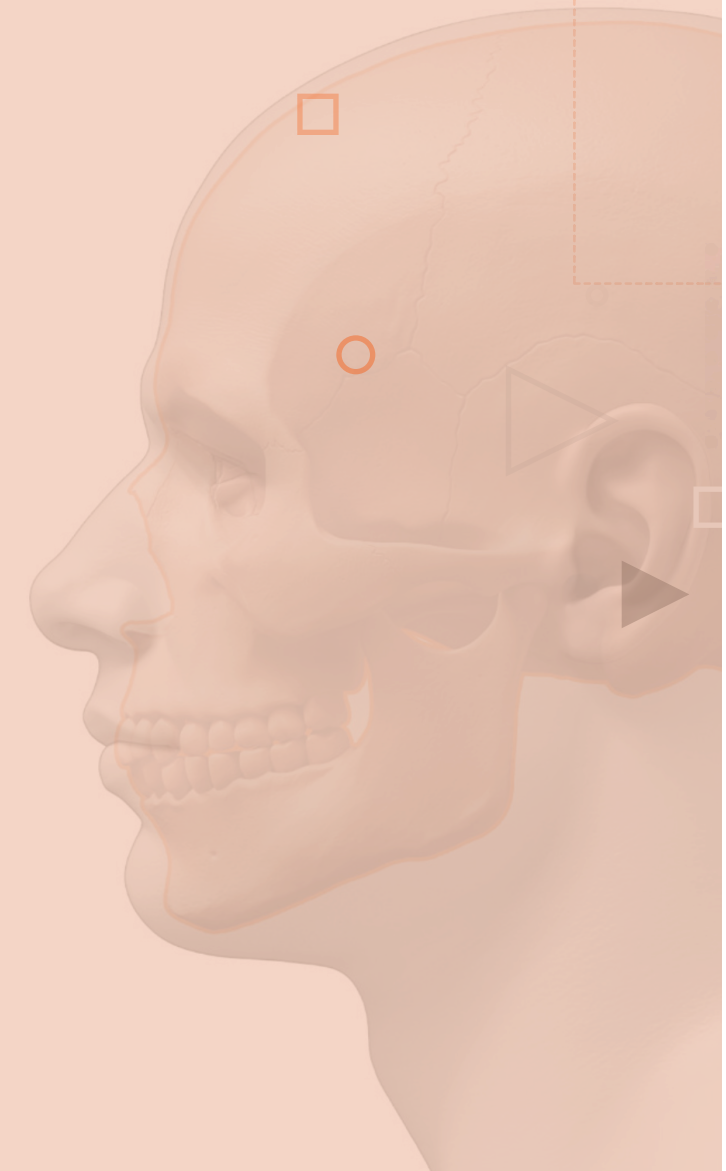
Step 6: Move forward with defining the widest part of the skull and the width of the teeth. (See Page 6)



Step 7: Establish the lower limit of the Zygomatic bones and define the top and bottom horizontal limits of the teeth. (See Page 5,6,13)



Step 8: Finally, define the meeting point of the upper and lower teeth and establish the vertical boundaries of the teeth. (See Page 12)



About the Author

Gusztav Velicsek is an accomplished 3D Generalist with over 14 years of experience in the Computer Graphic Industry. Having worked as a 3D and Texture Artist on best-selling AAA video games, Gusztav joined the 3D4Medical team in 2013 as a 3D modeller. He played a crucial role in developing the realistic feel of the Complete Anatomy model and currently serves as the Director of 3D at 3D4Medical. Additionally, Gusztav is actively engaged in the Irish Computer Graphics community, founding and co-organizing 3D Meetup Dublin. He has presented at the Irish VFX Summit and is a past guest presenter for the Artistic Anatomy module at the University of Derby and St George's University of London.

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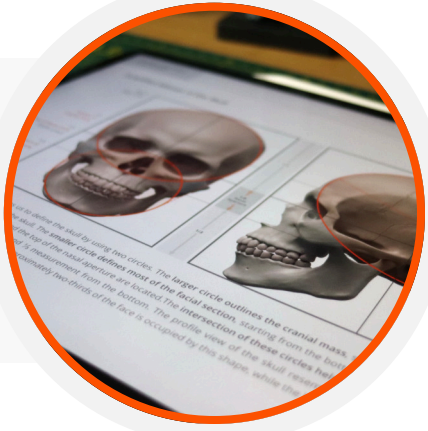

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